CLAIMS

What is claimed is:

1. An apparatus comprising:

a hybrid network having a hybrid input, a receive input, and a hybrid output, wherein the receive input is capacitively coupled to a subscriber line carrying an upstream data signal and a downstream data signal;

a driver providing the upstream data signal to the subscriber line and the hybrid input, wherein the driver is capacitively coupled to the hybrid input, wherein the hybrid output provides the extracted downstream data signal from the subscriber line.

2. The apparatus of claim 1 wherein the hybrid network resides on an integrated circuit die.

3. The apparatus of claim 2 wherein the driver resides on the same integrated circuit die.

4. The apparatus of claim 1 wherein the hybrid network is a complementary metal oxide semiconductor integrated circuit.

5. The apparatus of claim 1 wherein the upstream and downstream data signals are multitone modulated data signals.

6. An apparatus, comprising:

a hybrid network coupled to receive an upstream data signal and a downstream data signal communicated on a subscriber line, the hybrid network extracting the downstream data signal, wherein the hybrid network order is less than or equal to 2.

7. The apparatus of claim 6 wherein the hybrid network further comprises:

a receive port coupled to receive a composite signal including the upstream and downstream data signals from the subscriber line and the upstream data signal from a driver, wherein a transfer function from the driver to the receive port is $\frac{Z(s)}{R_D + Z(s)}$, wherein R_D is a driver output impedance wherein Z(s) is a subscriber line impedance;

an output port providing the extracted downstream data signal, wherein a transfer function from the receive port to the output port is $K_{rx} \cdot \frac{s}{s + HYB0}$, wherein HYB0 is programmatically adjustable, wherein K_{rx} is a receive path gain.

8. The apparatus of claim 7 wherein the hybrid network further comprises:

a hybrid input port coupled to receive the upstream data signal from the driver, wherein a transfer function from hybrid input port to the hybrid output port is $K_{HYB} \cdot \frac{s}{s + HYBP}$, wherein HYBP is programmatically adjustable, wherein K_{HYB} is a hybrid path gain.

9. The apparatus of claim 8 wherein the subscriber line impedance is approximated by series coupled resistor R_X and capacitor C_X, wherein the transfer function from the driver to the receive port to the output is $K_{rx} \cdot \frac{1+sC_xR_x}{1+sC_x(R_x+2R_D)} \cdot \frac{s}{s+HYB0}$, wherein HYB0 is adjusted to have a value substantially equivalent to $\frac{1}{R_XC_X}$, wherein wherein HYB0 is adjusted to substantially match Z(s), wherein HYBP and KHYB are selected such that $K_{HYB} \cdot \frac{s}{s+HYBP}$ is substantially the same as $K_{rx} \cdot \frac{1+sC_xR_x}{1+sC_x(R_x+2R_D)} \cdot \frac{s}{s+HYB0}$.

10. The apparatus of claim 6 wherein the hybrid network is tuned to behave substantially as a first order network.

11. The apparatus of claim 6 wherein the hybrid network resides on an integrated circuit die.

12. The apparatus of claim 11 wherein the hybrid network is a complementary metal oxide semiconductor integrated circuit.

13. The apparatus of claim 6 wherein the upstream and downstream data signals are multitone modulated data signals.